

ABSTRACT

A porous metal oxide semiconductor with a band gap of greater than 2.9 eV spectrally sensitized on its internal and external surface
5 with one or more metal oxides with a band-gap of less than 2.9 eV or a mixture thereof; a process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: providing a nano-porous metal oxide with a band gap of greater than 2.9 eV,
10 applying a solution of a metal compound or salt which upon pyrolysis or upon hydrolysis and subsequent pyrolysis yields a metal oxide with a band-gap of less than 2.9 eV and heating the nano-porous metal oxide with a band-gap of greater than 2.9 eV to which the metal salt had been applied to pyrolyse or hydrolyse and
15 subsequently pyrolyse the salt to the metal oxide with a band-gap of less than 2.9 eV; and a second process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: (i) preparing a solution containing a metal compound or salt that
20 pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide semiconductor with a band-gap of greater than 2.9 eV and a metal compound or salt that pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide with a band-gap of less than 2.9 eV,
(ii) adding a water-soluble polymer to the solution prepared in step
25 (i), (iii) coating the solution prepared in step (ii) on a support, and (iv) heating the coated support prepared in step (iii) to a temperature at which the water-soluble polymer is no longer present in the coating support.